



Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at <http://about.jstor.org/participate-jstor/individuals/early-journal-content>.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

192. Proposed by ALFRED HUME, C. E., D. Sc., Professor of Mathematics, University of Mississippi, University, Miss.

Of all triangles with a common base and inscribed in the same circle, the isosceles is the maximum and has the maximum perimeter. Prove geometrically.

Solution by G. B. M. ZERR, A. M., Ph. D., The Temple College, Philadelphia, Pa., and JEANNETTE BROOKS, S. B., Chicago, Ill.

Let ABC be the isosceles triangle and ADB any other triangle, $AD > DB$. Produce AD to F , making $DF = DB$. Draw CF , BF , CD , DG . Then $\angle ADC = \angle FDE$; $\angle ADC$ is measured by $\frac{1}{2}(\text{arc } AC) = \frac{1}{2}(\text{arc } CDB) = \angle BDE$.

$$\therefore \angle ADC = \angle BDE = \angle FDE.$$

$\therefore CDE$ is perpendicular to BF at its mid-point. $\therefore CB = CF$.

Now $AC + CF > AF$. But $AF = AD + DB$, and $AC + CF = AC + CB$.

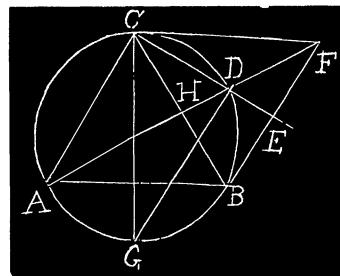
$\therefore AC + CB > AD + DB$. $\therefore AC + CB + AB > AD + DB + AB$.

$\frac{\triangle ADC}{\triangle BDC} = \frac{AC \times AD}{BC \times BD}$, but $AC = BC$ and $AD > BD$.

$\therefore \triangle ADC > \triangle BCD$. Take away the common triangle CHD and we get $\triangle AHC = \triangle BHD$.

$$\therefore \triangle ABH + \triangle AHC > \triangle ABH + \triangle BHD. \therefore \triangle ABC > \triangle ABD.$$

Also solved by CLARENCE A. SHORT, and LON C. WALKER.



CALCULUS.

158. Proposed by L. C. WALKER, A. M., Graduate Student, Leland Stanford Jr. University, Cal.

It is required to cut a hole a inches square, for a crank shaft, through the center of a grindstone b inches thick at the outer edge, c inches thick at the center, and d inches in diameter. How many cubic inches will have to be cut out?

I. Solution by WILLIAM HOOVER, A. M., Ph. D., Ohio University, Athens, O., and G. B. M. ZERR, A. M., Ph. D., The Temple College, Philadelphia, Pa.

The equation to a right circular cone, its base being the plane of x , y , and center the origin of coördinates, is $x^2 + y^2 = \frac{r^2}{h^2}(h-z)^2$; r , the radius of base, and h , the altitude. In this example, $h = \frac{1}{2}c$, and $r = \frac{cd}{2(c-b)}$. The required volume $= \iiint dxdydz$. The limits of z are $\frac{c}{2} \left(1 - \frac{1}{r} \sqrt{x^2 + y^2}\right)$, $-\frac{c}{2} \left(1 - \frac{1}{r} \sqrt{x^2 + y^2}\right)$; of y , $\frac{1}{2}a$, $-\frac{1}{2}a$; of x , $\frac{1}{2}a$, $-\frac{1}{2}a$.

$$\therefore \iiint dxdydz = c \iint dxdy - \frac{c}{r} \iint dxdy \sqrt{x^2 + y^2} = ac \int dx$$